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| EXAMINER | |
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**BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Application Number: 10/596,859
Filing Date: June 27, 2006
Appellant(s): NYSTROM ET AL.

Per Johan Anders Nystrom
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 09/17/2009 appealing from the Office action mailed 08/11/2009.

**(1) Real Party in Interest**

The real party in interest in the present appeal is Telefonaktiebolaget LM Ericsson (Publ) AN, assignee of the present application.

**(2) Related Appeals and Interferences**

The Examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

| | | |
|---|---|---|
| 20070188665 | Krishnan et al. | 1-2003 |
| 2003/0169681 | Li et al. | 4-2001 |

| | | |
|---|---|---|
| 7,386,306 | Laroia et al. | 12-2004 |

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

The same references, Watson and Castillo, have been used in the action below.

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 2, 6-12, 14-18, 21-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watson et al US 20070188665 in view of Castillo US 20040001500.

3. Regarding claims 14, and 23-25, Krishnan teaches a method, system, base station and a mobile station in a multicarrier wireless telecommunication system for radio communication between base stations and mobile user stations **[Title]**, comprising the step of: detecting a presence of an acquisition channel by a mobile station for mobile station search purposes; transmitting information signals over the detected acquisition channel **[Columns 1 and 2, lines 62-67 and lines 1-3; i.e. Pilot transmission represents overhead in the OFDM system. Thus, it is desirable to minimize pilot transmission to the extent possible. However, because of noise and other artifacts in the wireless channel, a sufficient amount of pilot needs to**

**be transmitted in order for the receiver to obtain a reasonably accurate estimate of the channel response. Moreover, the pilot transmissions need to be repeated to account for variations in the channel over time due to fading and changes in the multipath constituents]**, relating to size and location of operational bands of the radio spectrum used by the system; wherein the information signals comprise information of the bandwidth, and location, in the spectrum of the operational bands as part of the information in one or more sub carriers of the bands **[Figures 5, column 11, lines 22-40; i.e. FIG. 5 illustrates an embodiment of an OFDM subband structure 500 that supports subband multiplexing. In this embodiment, the M usable subbands are initially divided into S disjoint sets, with each set including Q consecutive subbands, where QS.ltoreq.M. The Q subbands in each set are assigned to the Q groups such that the i-th subband in each set is assigned to the i-th group. The S subbands in each group would then be uniformly distributed across the M usable subbands such that consecutive subbands in the group are separated by Q subbands. The M usable subbands may also be distributed to the Q groups in some other manners. The Q groups of subbands may be assigned to up to Q terminals for uplink pilot transmission. Each terminal would then transmit a pilot only on its S assigned subbands. With subband multiplexing, up to Q terminals may simultaneously transmit pilots on the uplink on up to M usable subbands. This can greatly reduce the amount of overhead needed for uplink pilot transmission].** But Krishnan does not specifically teach the location in the spectrum of the operational bands. Li teaches a multi-carrier communications with

group-based subscriber allocation **[Title]**, whereby the base station selects one or more clusters (i.e. a group of sub-channels) for each subscriber and then notifies the subscriber regarding cluster allocation **[Figure 1B, steps 104 & 105, see also page 3, paragraph 0043]**, in addition, Li teaches that the base station transmits to the subscriber pilot symbols that occupies the entire OFDM frequency bandwidth and showing the used **(shaded)** and unused **(un-shaded)** clusters in different cells **[Figures 2A-C, page 5, paragraph 0064]**. Therefore, it would have been obvious to a person of ordinary skill in the art to include the multi-carrier communications with group-based subscriber allocation of Li in the method and apparatus of Krishnan in order for the base station to inform the mobile station of the available sub-channels.

4. Regarding claims 15 and 17, Krishnan further teaches that the location information is explicitly signaled or implicitly derivable from synchronization signals, and that the size information is repeated regularly in subsequent carriers, or sub-carriers, of the operational band **[Figure 5, showing the M-usable bands of the bandwidth, and their sizes F, F+Q, F+2Q, F+3Q...]**.

5. Regarding claims 16 and 26, Krishnan further teaches that the signaling is received by the mobile user stations which detect the information about available blocks of the spectrum and stores it into a memory **[At terminal 750, the downlink modulated signal is received by antenna 752 and provided to a receiver unit (RCVR) 754. Receiver unit 754 conditions (e.g., filters, amplifies, and frequency downconverts) the received signal and digitizes the conditioned signal to provide samples. An OFDM demodulator 756 then removes the cyclic prefix appended to**

**each OFDM symbol, transforms each recovered transformed symbol using an FFT, and demodulates the recovered modulation symbols to provide demodulated data. An RX data processor 758 then decodes the demodulated data to recover the transmitted traffic data. The processing by OFDM demodulator 756 and RX data processor 758 is complementary to that performed by OFDM modulator 720 and TX data processor 710, respectively, at access point 700. OFDM demodulator 756 may further determine the initial channel frequency response estimate [circumflex over (H)]$_d$ or provide the received pilot symbols that may be used].**

6. Regarding claim 18, Krishnan further teaches that the information comprises the start and stop frequencies of the band and, thereby, the bandwidth **[Figure 5, see for example set 1, first Q subband and the clear marking of where the bandwidth of that subband start and where it ends]**.

7. Regarding claim 19, Krishnan further teaches that the information comprises an identifying number representing the size and location of available operational bands **[Figure 5, #s F, F+Q, F+2Q, F+3Q, F+SQ, F+M-1]**.

8. Regarding claim 20, Krishnan further teaches that the mobile user stations repeatedly scan the information signaling for updating its memory about changing conditions relating to the operational bands **[Columns 1 and 2, lines 62-67 and lines 1-3; i.e. Pilot transmission represents overhead in the OFDM system. Thus, it is desirable to minimize pilot transmission to the extent possible. However, because of noise and other artifacts in the wireless channel, a sufficient amount of pilot**

**needs to be transmitted in order for the receiver to obtain a reasonably accurate estimate of the channel response. Moreover, the pilot transmissions need to be <u>repeated</u> to account for variations in the channel over time due to fading and changes in the multipath constituents]**.

9. Regarding claim 22, Li further teaches a mobile user station requests access to a multicarrier band with N carriers **[Figure 1A]** for downloading information, comprising the steps of: the mobile station searching the radio interface for an N-carrier band by looking for location and size information; the communication system assigning a free band with N+Ɛ carriers to the mobile upon the request where Ɛ is zero or a small number compared to N; and, the mobile station downloads the information **[page 3, paragraph 0040; i.e. N= 512 sub-carriers, and ~ being zero].**

10. Regarding claim 10, Castillo teaches wherein at least one of the plural prediction techniques uses content of the video data associated with each channel to determine the predicted next channel **(paragraph [0021]).**

11. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Number 7,039,001 (Krishnan et al.) in view of U.S. Patent Application Publication Number 2003/0169681 (Li et al.) and further in view of U.S. Patent Number 6,650,655 (Alvesalo et al.).

12. Regarding claim 21, Krishnan and Li has been discussed above in regard to claim 14, but Li fails to teach that the operational bands belong to different network operators and wherein the subscribers of an operator may partly or wholly have access to the operational bands of another operator. Alvesalo teaches a system and method for

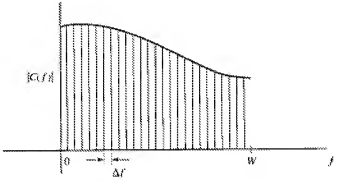
allocating transmission resources between different networks where the available bandwidth is shared among the different networks **[Figure 2, column 11, lines 29-34]**. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the resource allocation system of Alvesalo in the combined systems of Krishnan and Li in order for the mobiles in the system to have a seamless communication.

**(10) Response to Argument**

TECHNOLOGY BACKGROUND

OFDM is a multiplexing technique that divides the available bandwidth into multiple frequency sub carriers that are closely spaced to each other without causing interference. The sub-carriers are divided into groups of sub-carriers, each group called a sub-channel. The sub-carriers that form a sub-channel need not be adjacent to each other. OFDMA provides multiplexing operation of data streams from multiple users onto the downlink sub-channels and uplink multiple access by means of uplink sub-channels. In OFDMA, each symbol consists of sub-channels that carry data sub-carriers carrying information, pilot sub-carriers that serve as control signals, DC sub-carriers as the center frequency, and the guard sub-carriers for keeping space between OFDMA signals.

In multicarrier modulation, the available bandwidth W is divided into a number $N_c$ of subbands, commonly called subcarriers, each of <u>width</u> $\Delta f = W/N_c$ (i.e. **<u>the size</u>** of each of the subcarriers) as seen in the graph below.




**Summary of Appellant's arguments and Examiner's Stance:**

In general, the appellant mainly argues that in a multicarrier wireless telecommunication system for radio communication between base stations and mobile user stations, comprising the step of: detecting a presence of an acquisition channel by a mobile station for mobile station search purposes; transmitting information signals, over the detected acquisition channel, relating to size and location of operational bands of the radio spectrum used by the system; wherein the information signals comprise information of the bandwidth and location in the spectrum of the operational bands as part of the information in one or more sub carriers of the bands is neither taught or suggested by Krishnan alone or in combination with Li.

The Examiner respectfully disagrees because:

Krishnan teaches a method, system, base station and a mobile station for detecting a presence of an acquisition channel by a mobile station for mobile station search purposes; transmitting information signals over the detected acquisition channel

in columns 1 and 2, lines 62-67 and lines 1-3; i.e. Pilot transmission represents overhead in the OFDM system. Thus, it is desirable to minimize pilot transmission to the extent possible. However, because of noise and other artifacts in the wireless channel, a sufficient amount of pilot needs to be transmitted in order for the receiver to obtain a reasonably accurate estimate of the channel response. Moreover, the pilot transmissions need to be repeated to account for variations in the channel over time due to fading and changes in the multipath constituents, relating to size and location of operational bands of the radio spectrum used by the system; wherein the information signals comprise information of the bandwidth, and location, in the spectrum of the operational bands as part of the information in one or more sub carriers of the bands in Figures 5, column 11, lines 22-40; i.e. FIG. 5 illustrates an embodiment of an OFDM subband structure 500 that supports subband multiplexing. In this embodiment, the M usable subbands are initially divided into S disjoint sets, with each set including Q consecutive subbands, where QS.ltoreq.M. The Q subbands in each set are assigned to the Q groups such that the i-th subband in each set is assigned to the i-th group. The S subbands in each group would then be uniformly distributed across the M usable subbands such that consecutive subbands in the group are separated by Q subbands. The M usable subbands may also be distributed to the Q groups in some other manners. The Q groups of subbands may be assigned to up to Q terminals for uplink pilot transmission. Each terminal would then transmit a pilot only on its S assigned subbands. With subband multiplexing, up to Q terminals may simultaneously transmit pilots on the uplink on up to M usable subbands. This can greatly reduce the amount of

overhead needed for uplink pilot transmission. But Krishnan is silent on the issue regarding the location in the spectrum of the operational bands. Li teaches a multi-carrier communications with group-based subscriber allocation, whereby the base station selects one or more clusters (i.e. a group of sub-channels) for each subscriber and then notifies the subscriber regarding cluster allocation in Figure 1B, steps 104 & 105, see also page 3, paragraph 0043, in addition, Li teaches that the base station transmits to the subscriber pilot symbols that occupies the entire OFDM frequency bandwidth and showing the used (shaded) and unused (un-shaded) clusters in different cells in Figures 2A-C, page 5, paragraph 0064. Therefore, it would have been obvious to a person of ordinary skill in the art to include the multi-carrier communications with group-based subscriber allocation of Li in the method and apparatus of Krishnan in order for the base station to inform the mobile station of the available sub-channels.

Therefore the examiner contends that Krishnan did show in a multicarrier wireless telecommunication system for radio communication between base stations and mobile user stations, comprising the step of: detecting a presence of an acquisition channel by a mobile station for mobile station search purposes; transmitting information signals, over the detected acquisition channel, relating to size and location of operational bands of the radio spectrum used by the system; wherein the information signals comprise information of the bandwidth and location in the spectrum of the operational bands as part of the information in one or more sub carriers of the bands, and that the combination showed all the argued limitations and the rejection should stand.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be maintained.

Respectfully submitted,

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Examiner, Art Unit 2617

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